

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

REC'D 25 NOV 2005

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(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PC-21014980	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/SE2004/001074	International filing date (<i>day/month/year</i>) 02.07.2004	Priority date (<i>day/month/year</i>) 22.07.2003
International Patent Classification (IPC) or national classification and IPC B65G17/20, B65G35/06, B61B10/02 // B61B3/00, B61B13/04, B65G21/20		
Applicant OCS Overhead Conveyor System AB et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
 - a. ☒ (*sent to the applicant and to the International Bureau*) a total of 4 sheets, as follows:
 - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - b. ☐ (*sent to the International Bureau only*) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

<input checked="" type="checkbox"/>	Box No. I	Basis of the report
<input type="checkbox"/>	Box No. II	Priority
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI	Certain documents cited
<input type="checkbox"/>	Box No. VII	Certain defects in the international application
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application

Date of submission of the demand 23.05.2005	Date of completion of this report 18.11.2005
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2004/001074

Box No. I Basis of the report

1. With regard to the language, this report is based on:

- ☒ the international application in the language in which it was filed
- ☐ a translation of the international application into _____ ,
which is the language of a translation furnished for the purposes of:
- ☐ international search (Rules 12.3(a) and 23.1(b))
- ☐ publication of the international application (Rule 12.4(a))
- ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☐ the international application as originally filed/furnished
- ☒ the description:
pages 1 - 11 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____
- ☒ the claims:
pages _____ as originally filed/furnished
pages* _____ as amended (together with any statement) under Article 19
pages* 1 - 4 received by this Authority on 15.09.2005
pages* _____ received by this Authority on _____
- ☒ the drawings:
pages 1 - 12 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2004/001074

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-12</u>	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	<u>1-12</u>	NO
Industrial applicability (IA)	Claims	<u>1-12</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The present invention relates to overhead conveyors of the type where at least one carriage is drivably arranged in an overhead girder system and from which load-holding means are suspended. In a known system of this kind (see D3) a spindle is arranged for driving the carriages and to provide for automatic switching to branches, driving through sharp bends and temporary disengagement from driving of individual movable carriages. The object of the invention is to provide an overhead conveyor with these features but much less expensive and more flexible. According to the invention, the girder system comprises an elongate straight box girder having a first inner space with rails for the drive carriage and a second elongate inner space comprising a driven endless drive element to drive the drive carriages by friction.

Reference is made to the following documents cited in the International Search Report:

D1: DE 2359267 A1

D2: US 6431347 B1

D3: SE 501744 C2

Regarding the amended claim 1, D1 is regarded as being the closest prior art. It discloses an overhead conveyor comprising drive carriages drivably arranged in an overhead track system and from which load-holding means are suspended. In each straight portion of the overhead track system the wheeled carriages travel on rails (4) arranged under a rail (3) supporting an endless drive chain (1). The track system

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX V

comprises curved driveless transition track portions (figure 3) between straight rail portions. Each drive carriage comprises two carriers (5,9) interconnected by a rod (10), to be in a fixed spaced-apart relationship in the longitudinal direction of the track system. Each carrier is provided with a driver (6;11) to engage the drive element so as to transfer drive to the drive carriage. From figure 1, it is seen that one driver (6) is movable in its longitudinal direction and normally influenced by a spring to be engaged by a dog (8) on the drive chain (1). The track system is made up of straight and curved portions, the curved portions without a drive element are shorter than the distance between two carriers (5,9) of the same drive carriage, figure 3. This is to allow a front carrier (5), which is moved into a curved track portion, to be "pushed", by the engagement of the rear carrier (9) with a dog (12) on the drive chain (1) of a preceding track portion, into a subsequent straight track portion where it comes into engagement with a dog (8) on a drive chain (1) and "pulls" the rear carrier through the curve.

Further, from figure 1 of D1, it is clear that one driver (6) of each carrier (5) is at its lower end connected to one part of a disengagement system, comprising parts on respective ends on successive drive carriages, for retraction of the driver (6) and thus, disconnection from the dog (8) on the drive chain (1). This principle is well known in the technical field of overhead conveyors and is used for disconnecting carriers from the drive element in queue situations; see for example D2, column 5 line 31- column 7 line 14, where the function of a similar disconnection construction is explained in detail.

The subject-matter of the amended claim 1 differs from D1 in that each carrier is provided with at least one friction driver preloaded to be pressed towards engagement with the drive element so as to transfer drive to the drive carriage and in that it comprises a fixedly arranged guide rail (37; 50) arranged to cooperate with the projecting portion (20; 32, 36) of the rear carrier (15) as the carrier passes the guide rail and further, in that it, instead of consisting of separate tracks/rails arranged to support the drive element

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Supplemental Box

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Continuation of: BOX V

and the carriages, comprises a box girder with an inner space for the drive element and an inner space for the rails supporting the carriages. However, this last feature is merely thought to be a design option obvious as a choice among others to a person skilled in the art, see for example D3 where such an arrangement is shown.

The problem to be solved by the present invention may therefore be regarded as to come up with an overhead conveyor less expensive and more flexible than D1.

However, from D2 is known an overhead conveyor with hanger carriers driven by frictional engagement of preloaded (by springs 35) friction drivers (23; 23') with an endless drive belt (21). Fixedly arranged guides (47) arranged to cooperate with a portion of a hanger carrier (1) to unlock the drive connection as the carrier passes the guide. It is stated in D2 that the preferred embodiment describes a conveying apparatus in which the drive belt is a frictional belt and the coupling element of the hanger carrier has a frictional surface to be connected to the frictional belt with frictional locking to produce the drive connection, but that it can be used for hanger carriers in chain conveyors with a chain as the drive member, see paragraph [0010].

Therefore, it is not considered to require any inventive work by a person skilled in the art to apply the friction drive of D2 to the overhead conveyor in D1, thereby arriving at an overhead conveyor mainly according to claim 1.

The subject-matter of claim 1 does therefore not involve an inventive step (Article 33(3) PCT).

Regarding the switching point arrangement in the characteristic part of claim 6 is further referred to D3, page 4 line 25- page 5 line 6 and figure 7, where such an arrangement is described in detail. The skilled person would therefore regard it as a normal design option to include this feature in the overhead conveyor described in D1 in combination with D2.

The subject-matter of claim 6 does therefore not involve an

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Continuation of: BOX V

inventive step (Article 33(3) PCT).

Further, the overhead conveyor referred to in claims 2-5 and 7-12 is not considered to differ essentially from what is known from the cited documents D1 and D2 in combination. If it can be shown that some aspect covered by claims 2-5 and 7-12 provides unexpected effects and the claims are restricted accordingly, the judgement may be reconsidered. Until these conditions are met, claims 2-5 and 7-12 are not considered to involve an inventive step.

CLAIMS

1. An overhead conveyor comprising
an elongate straight box girder (9) having a first
5 inner space with rails (12) and a second elongate inner
space comprising an endless driven drive element (5, 6),
a drive carriage (13) comprising a front carrier
(14; 53a, 53b) and a rear carrier (15; 52a, 52b) which
are arranged in a fixed spaced-apart relationship in the
10 longitudinal direction of the girder and adapted to run
on said rails (12),
each carrier being provided with at least one
friction driver (31; 40) preloaded to be pressed towards
engagement with the drive element (5) so as to transfer
15 drive to the drive carriage (13),
characterized in
that each driver (31, 40) in its lower part has
projecting portions (20; 32, 36) adapted, in cooperation
with a guide means (22; 34; 37; 50), to be able to move
20 the driver out of engagement with the drive element (5),
that the conveyor further comprises a fixedly
arranged guide rail (37; 50) arranged to cooperate with
the projecting portion (20; 32, 36) of the rear carrier
(15) as the carrier passes the guide rail, and
25 that the rear carrier (15; 52a, 52b) is provided
with a depressing means (22; 34) adapted to cooperate
with the projecting portion of the front carrier (14;
53a, 53b), for the purpose of being able to accumulate a
number of drive carriages in the girder system, along
30 said rail (37; 50).
2. An overhead conveyor according to claim 1,
wherein said projecting portions of the driver (31; 40),
in the front carrier (14) of a drive carriage (13), are
35 formed as a ramp-shaped inclined driver plate (20), while
said depressing means of the rear carrier (15) are formed

as a rearwards projecting pressing roller (22) which is adapted, in contact with the ramp-shaped driver plate (20) of a subsequent drive carriage (13), to force its driver to be disconnected from the drive element.

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3. An overhead conveyor according to claim 1, wherein said projecting portions (32) of the driver (31; 40), in the front carrier (14) of a drive carriage (13), are provided with friction-reducing means (33), while
10 said depressing means (34) of the rear carrier (15) are a ramp-shaped and inclined, and adapted, in contact with the projecting portions (32) of a subsequent front carrier (14), to force its driver to be disconnected from the drive element.

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4. An overhead conveyor according to any one of the preceding claims, wherein the drive element (5, 6) has an essentially flat surface, and at least one driver (31) is provided with an essentially flat upper surface,
20 adapted to be brought into frictional engagement with the essentially flat surface of the drive element.

5. An overhead conveyor according to any one of the preceding claims, wherein the girder system is made up of
25 straight portions (9) and curved portions (9", 9a, 9b), each curved portion having a second elongate inner space without a drive element, said curved girder portions being shorter than the distance between two carriers (14, 15) of the same drive carriage (13) to allow a front
30 carrier (14) of a drive carriage (13), which is moved into a curved girder portion (9", 9a, 9b), to be moved by the engagement of the rear carrier (15) with the drive element (5) of the preceding straight girder portion (9), through the curved girder portion (9", 9a, 9b) and into a
35 subsequent straight girder portion (9) and there come into engagement with the drive element (5) in this subsequent girder portion (9).

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6. An overhead conveyor according to any one of the preceding claims, wherein switching points are connectable in the girder system, said switching points
5 having a straight girder (9') connectable to a first straight girder (9) and provided with a space having rails (12) for carriers which is movable away from the girder space with the drive element, and with a second curved girder portion (9b) which, during movement of the
10 above-mentioned space, at the same time is positioned in contact with the first straight girder (9) and with a subsequent curved girder portion (9a).

7. An overhead conveyor according to any one of the preceding claims, wherein the guide means is movably
15 arranged to be able to actuate, manually or by remote control, the driver (31; 40) to perform disconnection of the drive for a carrier (14, 15).

8. An overhead conveyor according to any one of the preceding claims, wherein said guide rail (37; 50) is arranged to cooperate with a peripheral part (36) of said projecting portions, while a depressing means (22; 34) is adapted to cooperate with an inner part (32) of said
25 projecting portions.

9. An overhead conveyor according to any one of the preceding claims, wherein the drive element (5, 6) is provided with a number of through holes (23), and wherein
30 each carrier (14, 15) is provided with a driver (39) comprising a friction driver (40) as well as a movable pin (19) adapted to be engaged with and disengaged from the holes (23) in the drive element (5).

35 10. An overhead conveyor according to any one of the preceding claims, wherein the drive element is a belt or a positive drive belt.

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11. An overhead conveyor according to claim 10,
wherein the drive belt (5, 6) is passed over drive and
terminal rollers (4) arranged close to the ends of the
5 straight girder portions (9), and of which at least one
drive roller (4) is driven by a motor (1) via a belt
transmission (2, 3).

12. An overhead conveyor as claimed in claim 11,
10 wherein the drive motor (1) is connectible to a drive
roller, arranged at a distance therefrom, for a second
drive belt (5, 6) by means of a flexible shaft (30).